

# HIGH-YIELD ANTIBIOTICS

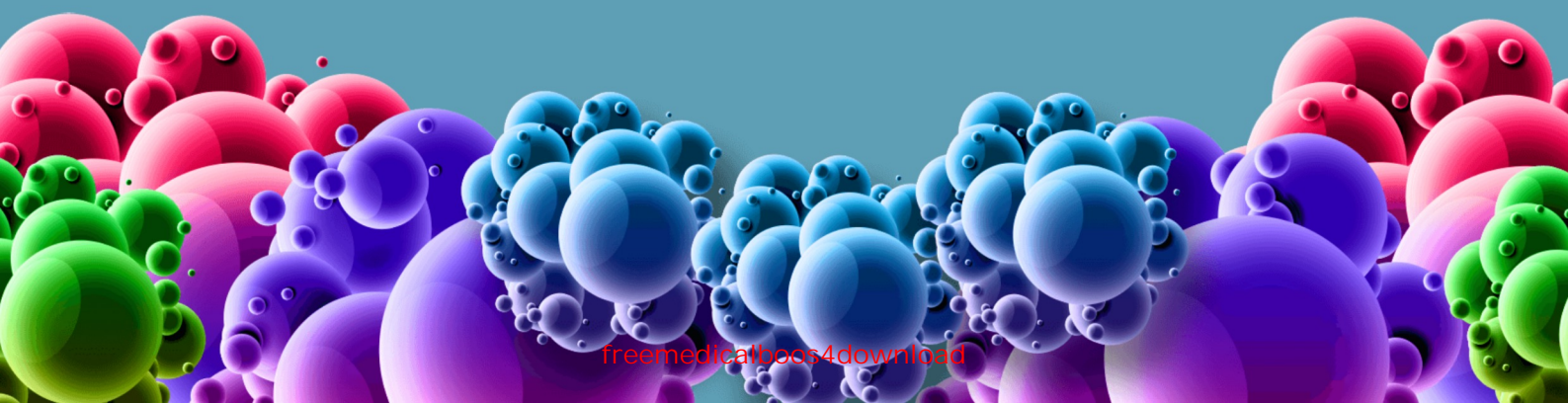
**for USMLE, NBDE, FMGE, NEET**

**500+ High-yield points  
50+ Illustrations & Mnemonics**

**References and updates from Goodman Gilman's 13/e, Katzung & Trevor 13/e, Harrison's 19/e, CMDT 2018 & Standard journals**

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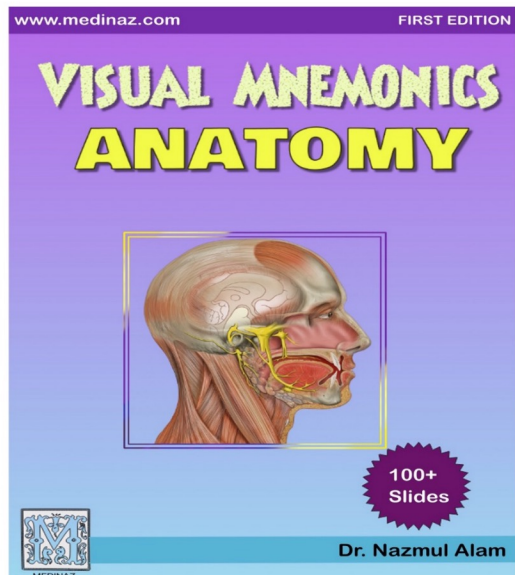
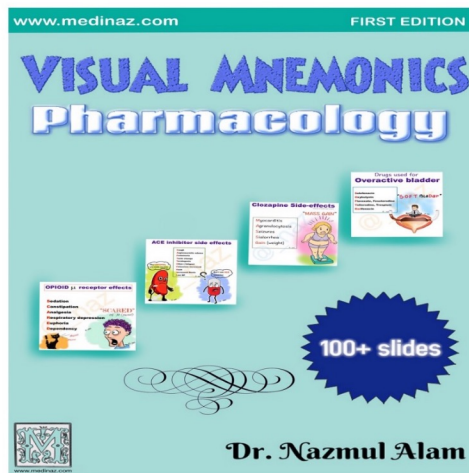
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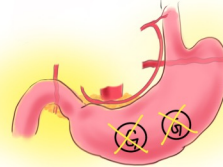




# Penicillin

Penicillin **G** (IV and IM form), penicillin **V** (oral).

Mn. Penicillin **G** destroys with **G**astric acid



**D-Ala-D-Ala** structural analog. Bind penicillin-binding proteins (**transpeptidases**). Block transpeptidase cross-linking of peptidoglycan in cell wall. Activate autolytic enzymes leads to **osmotic burst**.

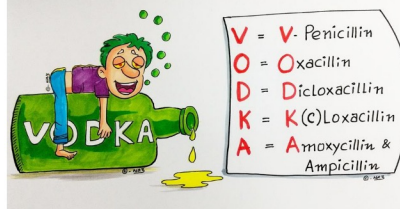
**Extend spectrum** penicillin – **A**mpicillin, **A**moxicillin, **C**arbenicillin, **T**icarcillin, **M**ezlocillin, **A**zlocillin, **P**iperacillin

Mn. **A CT MAP**



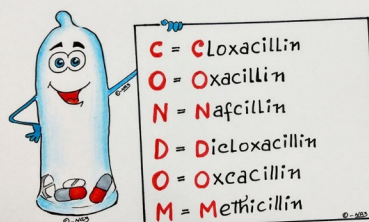
Acid resistant penicillin

## Acid resistance Penicillins



Penicillinase resistant penicillin

## Penicillinase resistant Penicillins..







Extended spectrum penicillin prevent **H** influenzae, **H** pylori, **E** coli, **L**isteria monocytogenes, **P**roteus mirabilis, **S**almonella, **S**higella, enterococci.

Mn. **HHELPSS**



Aqueous penicillin **G** is **DOC** for neurosyphilis

Methicillin resistance is developed due to the formation of alternative penicillin binding proteins that have less affinity for the drugs

Ampicillin is **DOC** for **L**isteria meningitis

Side effects:

Methicillin – interstitial nephritis

Oxacillin – hepatitis

Nafcillin – neutropenia

Carbenicillin high dose – bleeding

**N**afcillin = **N**eutropenia

**$\beta$ -lactamase inhibitors** - Include **C**lavulanic acid, **A**vibactam, **S**ulbactam, **T**azobactam.

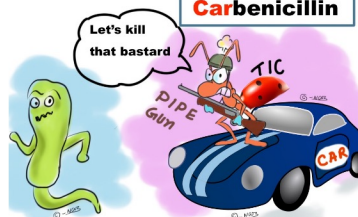
Mn. **CAST**



Anti-pseudomonal penicillin

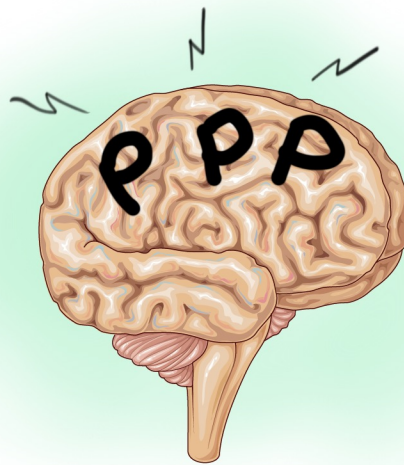
#### Anti-Pseudomonal Penicillin

**P**iperacillin  
**T**icarcillin  
**C**arbenicillin



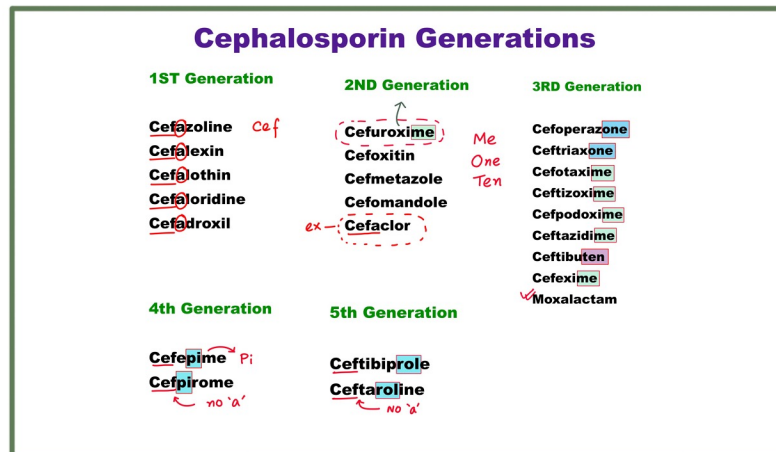


- **Benzathine penicillin** is the **longest acting** penicillin and it does **not** cross **BBB**
- If a patient develops severe **hypersensitivity** to **penicillin**, all other beta lactam antibiotics are contraindicated except **Aztreonam**
- **Procaine penicillin** can cause **Seizures** in high dose





- Excreted via kidney through tubular secretion (Ceftriaxone & Cefoperazone are secreted in bile)



- 4<sup>th</sup> generation cephalosporins – Cefpirome, cefepime
- 5<sup>th</sup> generation cephalosporins – Ceftobiprole, Ceftaroline
- Ceftazidime (max) & Cefoperazone are active against Pseudomonas
- Organisms typically not covered by 1st–4th generation cephalosporins are Listeria, Atypicals (Chlamydia, Mycoplasma), MRSA, and Enterococci (treated by ceftaroline) .

**“LAME”**

Listeria

Atypicals (Chlamydia, Mycoplasma),

MRSA

Enterococci

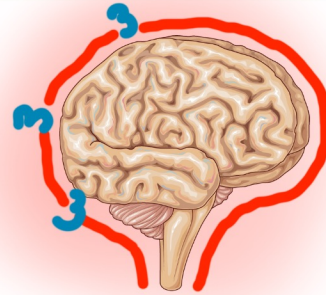






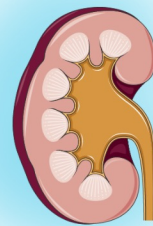
- 3<sup>rd</sup> generation cephalosporin can cross blood-brain barrier (BBB)

BBB = 3 letters  
3<sup>rd</sup> generation



- 5<sup>th</sup> generation cephalosporins are useful against MRSA
- Most nephrotoxic – Cephalexin

Cephalexin = Renal Impairment



- Cefazolin is DOC for surgical prophylaxis
- Ceftazidime is DOC for melioidosis
- Ceftazidime has maximum antipseudomonal activity
- Cefoperazone is active against pseudomonas, secreted in bile, doesn't cross BBB
- Important side effects - disulfiram-like reaction, vitamin K deficiency, increase nephrotoxicity of aminoglycosides.





# Carbapenems

Doripenem, Imipenem, Meropenem, Ertapenem  
(DIME antibiotics are given when there is a  
10/10 [life-threatening] infection).

Doripenem  
Imipenem  
Meropenem  
Ertapenem



Always administered with cilastatin (inhibitor  
of renal dehydropeptidase I) to decrease  
inactivation of drug in renal tubules.

the kill is **lastin'**  
with **cilastatin**



Only beta-lactam which are reliably efficacious  
against **Extend spectrum beta lactamase**.





- Newer carbapenems include **ertapenem** (limited Pseudomonas coverage) and **doripenem**.
- **Meropenem** has a **lower risk** of seizures and is stable to **dehydropeptidase I**







# Monobactams

- **Aztreonam** is the only beta-lactam antibiotic that can be used in patients having severe allergy to penicillin or cephalosporin.

**Aztreonam in Allergy**

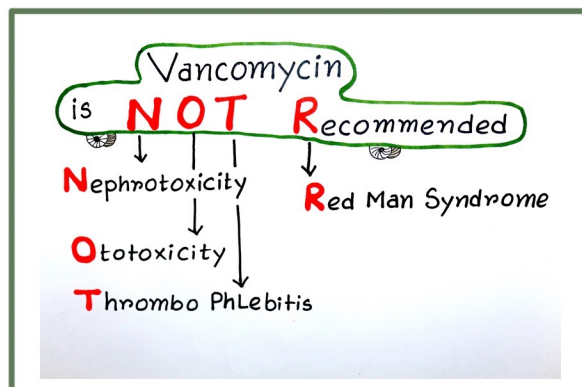


- **Gram -ve** rods only - **no** activity against gram + ve rods or anaerobes



# Vancomycin

- **Bactericidal** glycopeptide antibiotic that inhibit cell wall synthesis by inhibiting **transglycosylase enzyme**
- **DOC** for **MRSA** and **Clostridium jeikeium**
- **Bacteriostatic** against **C difficile**
- **Rapid IV** infusion can cause “**Red Man Syndrome**”
- Other side effects - **Nephrotoxicity**, **Ototoxicity**, **Thrombophlebitis**



- Resistance - Occurs in bacteria (eg, Enterococcus) via **amino acid modification** of D-Ala-D-Ala to **D-Ala-D-Lac**.

## Vancomycin

www.medinaz.com

2nd line drug for Pseudomembranous colitis

side effects.. Red Man Syndrome

(DOC for) MRSA

“If you **Lack** a **D-Ala** (dollar), you can’t ride the **van** (vancomycin).”

\* According to the current guideline Vancomycin is the **first line** drug for pseudomembranous colitis



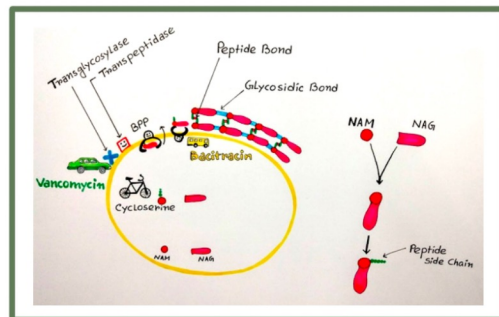


- **Bacitracin** – Only for **topical** use because of **nephrotoxicity**

Inhibits cell wall formation by interfering with **dephosphorylation** in cycling of the **lipid carrier** that transfer peptidoglycan subunits to the growing cell wall.

- **Cycloserine** - can cause neuropsychiatric symptoms

Inhibit **cell wall** synthesis



- All protein synthesis inhibitors are bacteriostatic, except **aminoglycosides** (bactericidal) and **linezolid** (variable).

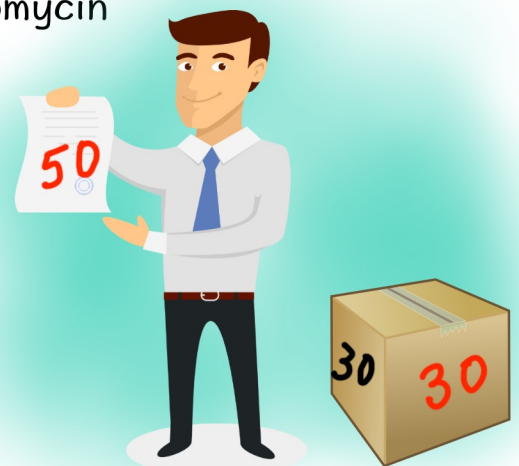
### **30S inhibitors**

**A**minoglycosides, **T**etracyclines

### **50S inhibitors**

**C**hloramphenicol, **C**lindamycin **E**rythromycin (macrolides) **L**inezolid

“Buy **AT 30**,  
**CCEL** (sell) at **50**.”







## Aminoglycosides

- Bactericidal, 30S inhibitor
- Post antibiotic effect and concentration dependent killing is seen
- It is ineffective against anaerobes
- Curare like effect is seen. Neomycin & Streptomycin should not be used with d-TC
- Do not cross BBB / CSF
- Streptomycin is not used in TBM (Tuberculous Meningitis)
- Streptomycin is the DOC for Plague & tularemia
- Neomycin can be used orally for hepatic encephalopathy & gut sterilisation
- Side effects - Nephrotoxicity, Neuromuscular blockade, Ototoxicity (especially when used with loop diuretics).

### Teratogen

Nephrotoxicity  
Neuromuscular blockade,  
Ototoxicity  
Teratogen

“NOT”



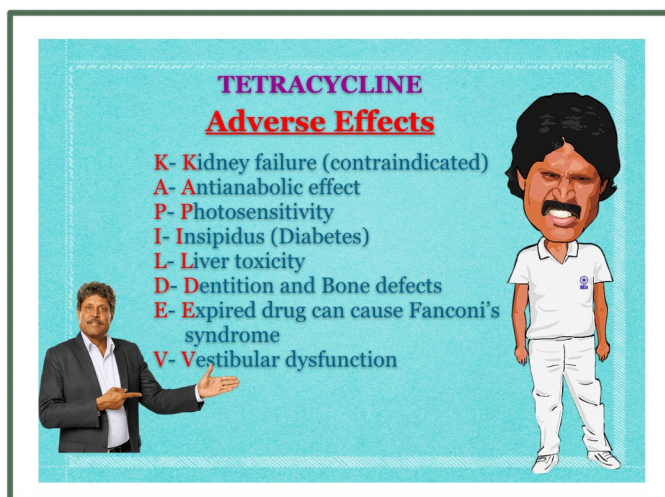
- Neuromuscular blockade is due to inhibition of pre-synaptic release of ACh which can cause severe respiratory depression (Reversed by IV calcium)



# Tetracyclines

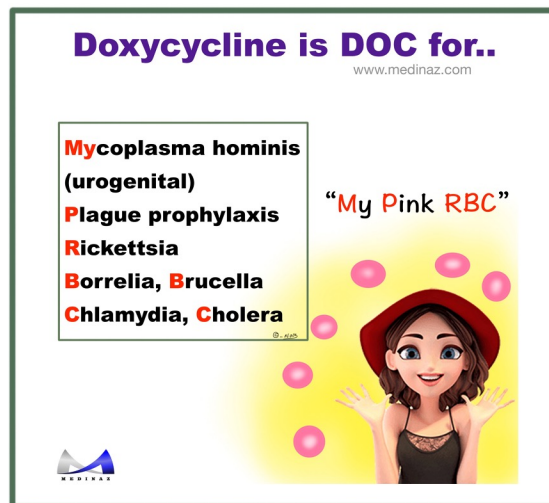
- **Bacteriostatic** & binds with **30S** ribosome
- All tetracyclines undergo **enterohepatic circulation**
- **Demeclocycline** is used in **SIADH**, the most potent inhibitor of **V2 receptors** in kidney
- Use

**T**  
**E**  
**T** } **TET**racyclines  
**R** – **R**ickettsia, **R**elapsing fever  
**A** – **A**typical pneumonia  
**C** – **C**holera  
**Y** – **LY**me's disease  
**C** – **C**hlamydia  
**L** – **L**GV  
**I**  
**N** } **IN**guinale (granuloma)  
**E** – **E**pidemics of plague





- Doxycycline is DOC for – Mycoplasma hominis (urogenital), Plague prophylaxis, Rickettsia, Borrelia, Brucella, Chlamydia, Cholera



- Contraindicated in pregnancy as it can cause fetal tooth enamel hypoplasia and discoloration and irregularities in the fetal bone growth.
- Minocycline specifically produce vestibular toxicity and brown discoloration of skin
- Children with <8 years with tetracycline (dose) cause tooth discolouration
- Doxycycline, Tigecycline, Minocycline can be used in patients with renal failure because of fecal elimination.







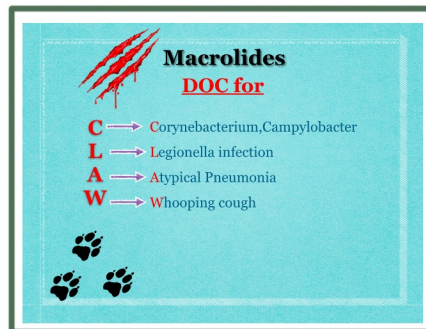
- Do not take tetracyclines with **milk** ( $\text{Ca } 2+$ ), **antacids** ( $\text{Ca } 2+$  or  $\text{Mg } 2+$ ), or iron-containing preparations because divalent cations inhibit drugs' absorption in the gut.
- Effective against **intracellular organisms** like **Rickettsia** and **Chlamydia**
- Tetracyclines are used for **prophylaxis** of **Cholera** & **Leptospirosis**



# Macrolides

- Binds to **50S** ribosome and block the **translocation** of **peptide chain**
- **Erythromycin** is excreted by **biliary root**.
- **Erythromycin** can cause **diarrhea** by the stimulation of **motilin receptors**
- **DOC** for

Chancroid by *Haemophilus ducreyi*, *Corynebacterium*,  
*Campylobacter*, *Legionella* infection, Atypical pneumonia,  
Whooping cough



- **Erythromycin** estolate can cause **pyloric stenosis**,  
**cholestatic jaundice**, **QT prolongation**
- **Azithromycin** is **DOC** for *Mycoplasma pneumoniae*  
and genitalium, **C**ampylobacter, **L**egionella and **C**hancroid

“**CALM** down **Azithro** is coming”

**C** - *Campylobacter*, **C**hancroid

**A** - *Azithromycin*

**L** - *Legionella*

**M** - *Mycoplasma pneumoniae* and genitalium



- **Azithromycin** is **DOC** for treatment of **cholera** and  
**chlamydia** in **pregnancy**
- **Macrolides** decrease inflammatory mediators and  
have **anti-inflammatory** and **immunomodulatory** effect.





## Chloramphenicol

- **Bacteriostatic** and **blocks peptidyltransferase** at **50S** ribosomal subunit.
- It can cause dose **independent aplastic anemia** and **gray baby syndrome** (in **premature infants** because they lack liver **UDP-glucuronosyltransferase**)

## Clindamycin

- **Clindamycin** treats anaerobic infections **above the diaphragm** and **metronidazole** treats anaerobic infections **below diaphragm**.



- Cause **Pseudomembranous colitis** (**C difficile** overgrowth)
- **DOC** for treatment of **Toxic Shock Syndrome** (TSS)



## Linezolid

- Active against MRSA, VRSA & VRE
- MAO inhibitory activity can cause Serotonin syndrome
- It is associated with bone marrow suppression, optic neuritis and lactic acidosis

## Sulfonamides

- Bacteriostatic, inhibit folate synthase competitively
- Not effective in the presence of pus because it contains large amount of PABA

Drugs undergo hepatic metabolism by Acetylation

- Sulfisoxazole is most soluble and has minimum risk of causing crystalluria
- Sulfadoxine is longest acting and Sulfacytine is shortest acting
- Sulfadoxine along with pyrimithamine and Artesunate is used for the treatment of chloroquine resistant malaria
- Sulfadiazine along with pyrimithamine is the treatment of choice of Toxoplasmosis







- Spiramycin is the DOC for toxoplasmosis in pregnancy
- Side effects – Aplastic anemia, Bilirubin displacement (kernicterus), Crystalluria, Rash, Acetylation, SLE, Hemolysis in G-6-PD deficiency

“ABC RASH”



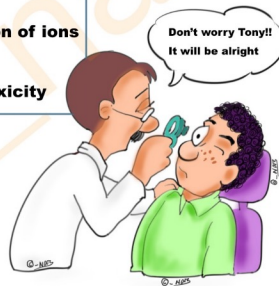


# Fluoroquinolones

- Inhibit DNA gyrase and topoisomerase IV
- Sparfloxacin has longest half life
- Gatifloxacin has maximum bioavailability
- Ciprofloxacin is the DOC for prophylaxis and treatment of anthrax and for prophylaxis of meningococcal meningitis
- In case of Acute diarrhea Ciprofloxacin is DOC and used only if patient is febrile
- NSAIDs increase CNS toxicity of fluoroquinolones

## Quinolones side effects

The → Tendinitis  
Good → GI discomfort  
Clinical → Chelation of ions  
Practice → Phototoxicity



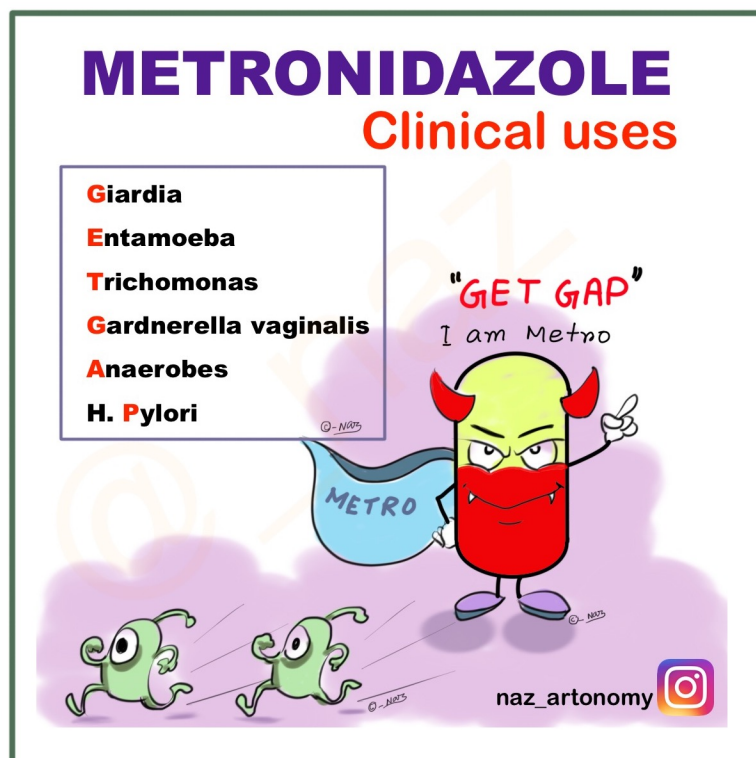
- Pefloxacin is the most lipid soluble fluoroquinolone and cross BBB maximum
- Ozenoxacin is a topical fluoroquinolone recently approved for treatment of Impetigo
- Contraindicated in pregnant women, nursing mothers, and children < 18 years old due to possible damage to cartilage. Some may prolong QT interval
- QT prolongation is maximum with sparfloxacin May cause tendonitis or tendon rupture in people > 60 years old and in patients taking prednisone





# Metronidazole

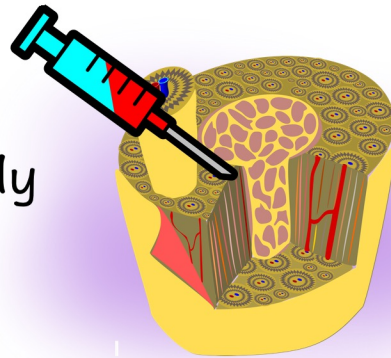
- Forms toxic free radical metabolites in the bacterial cell that **damage DNA**. **Bactericidal**, **antiprotozoal**
- **Disulfiram-like reaction** (severe flushing, tachycardia, hypotension) with **alcohol**
- Treats **anaerobic** infection **below the diaphragm**
- **DOC** for the treatment of **pseudomembranous colitis**, **bacteroides**, **symptomatic intestinal amebiasis**, **extra intestinal amebiasis**, **bacterial vaginosis**, **trichomoniasis** (strawberry vagina) & **tetanus**





- Dapsone cause Hemolysis in G6PD deficient patients, methemoglobinemia
- Trimethoprim can cause Megaloblastic anemia, leukopenia, granulocytopenia, which may be avoided with coadministration of folinic acid.

TMP Treats Marrow Poorly



- Antitubercular drugs - Rifampin, Isoniazid, Pyrazinamide, Ethambutol

Rifampin

Isoniazid

Pyrazinamide

Ethambutol

“RIPE”







# Refampicin

- **Bactericidal** and acts by inhibiting **DNA dependent RNA polymerase**
- It undergoes **enterohepatic circulation** and can be used **safely in renal failure patient**
- It can penetrate **BBB** and **placental barrier**
- Only bactericidal drug active **against dormant bacteria** and **solid caseous lesions**
- It is the **most effective** and **fastest** acting drug in **leprosy**
- It is the **least toxic** drug for TB and is also the safest drug in **pregnancy**

Rifampin's **4 R's**:

**R**NA polymerase inhibitor

**R**amps up microsomal cytochrome P-450

**R**ed/orange body fluids

**R**apid resistance if used alone

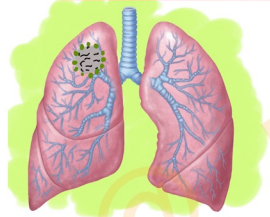




# Isoniazid

- Isoniazid is a **prodrug** activated by **catalase-peroxidase**
- **Bacteriostatic** against **resting** and **bactericidal** against **rapidly dividing organisms**
- Metabolized by **Acetylation** which is **genetically controlled**
- **Kat G** gene mutation is the most common mechanism of **resistance**
- **DOC** for **prophylaxis of TB**
- Isoniazid causes **B 6 deficiency** (**peripheral neuropathy**, **sideroblastic anemia**) (Mn. **INH** Injures **N**eurons and **H**epatocytes)

## INH Side effects



- I**nducer of Lupus  
inhibitor of cytochrome P450
- N**europathy (peripheral)
- H**epatotoxicity  
hemolysis in G6PD deficiency

- **Peripheral neuritis** can be prevented and treated by **pyridoxine**
- Can cause **hemolysis** in **G6PD deficient** patients
- **Side effects of INH**

## INH Side-effects

www.medinaz.com

### "CHANGE"

- C**hange in memory
- H**epatotoxic, **H**allucinations
- A**nemia, **A**rthritis
- N**europathy
- G**ynecomastia
- E**uphoria, **E**pilepsy

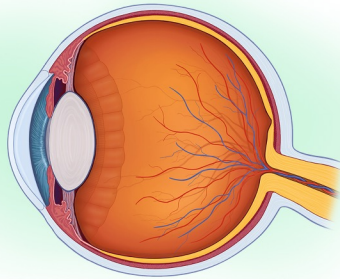




## Ethambutol

- Bacteriostatic and inhibit arabinosyl transferase
- Contraindicated in Children
- Ethambutol cause Optic neuropathy

**E**yethambutol = **E**ye problem



## Pyrazinamide

- Weakly bactericidal and works best at acidic pH (eg, in host phagolysosomes)

Pyrazinamide is a prodrug that is converted to the active compound pyrazinoic acid

**p**yrazinamide = **p**rodrug





## Antimicrobial drugs contraindicated in Pregnancy

**S**ulfonamides  
**A**minoglycosides  
**F**luoroquinolones  
**E**rythromycin  
**M**etronidazole  
**T**etracyclines  
**R**ibavirin  
**G**riseofulvin  
**C**hloramphenicol

**"SAFE** Moms **Take Really**  
**Good Care"**



## Chloroquine Uses



**My RED LIP**

**M**alaria  
**R**heumatoid arthritis  
**E**xtra intestinal amoebiasis  
**D**LE  
**L**epra reaction  
**I**nfectious mononucleosis  
**P**hotogenic reactions





## Miscellaneous

Antibiotics **contraindicated in Renal failure**

- Cephalthin
- Cephaloridine
- Nitrofurantoin
- Nalidixic acid
- Tetracyclines (except Doxycycline)



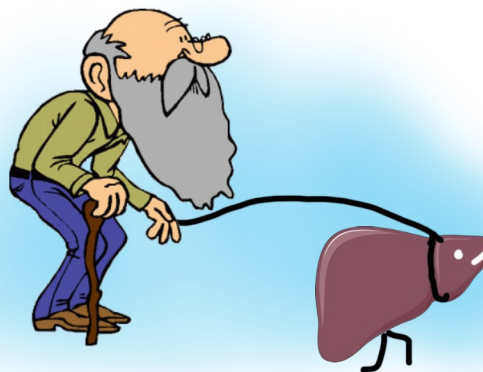
CNN Tv Channel



Antibiotics contraindicated in **Liver disease**

- Pyrazinamide, Pefloxacin
- Erythromycin estolate
- Tetracycline

“PET”





## Antibiotics causing important syndromes

Gray baby syndrome – Chloramphenicol

Pseudocholecystitis – Ceftriaxone

Fanconi syndrome – Outdated Tetracycline

Red man / Red neck syndrome – Vancomycin

Sicca syndrome – Sulfonamides

Sicca syndrome – Sulfonamides

## Antimicrobial prophylaxis

- High risk for endocarditis and undergoing surgical or dental procedures - Amoxicillin
- Exposure to gonorrhea – Ceftriaxone
- Rheumatic fever - Benzathine penicillin
- Meningococcal meningitis – Rifampicin / Ciprofloxacin / Ceftriaxone
- Rickettsial infection – Tetracyclines
- Malaria – Chloroquine / Mefloquine / Doxycycline
- Otitis media - Amoxicillin
- History of recurrent UTIs - TMP-SMX





- Exposure to **meningococcal infection** - Ceftriaxone, ciprofloxacin, or rifampin
- **Petrussis** — Azithromycin
- **Plague** — Tetracyclines
- **Toxoplasmosis** - Clotrimoxazole
- **Pregnant** woman carrying **group B strep** - Intrapartum penicillin G or ampicillin
- Prevention of **gonococcal conjunctivitis** in newborn  
= Erythromycin ointment on eyes
- Prevention of **postsurgical infection** due to **S aureus**  
= Cefazolin
- Prophylaxis of **strep pharyngitis** in child with prior **rheumatic fever** - Benzathine penicillin G or oral penicillin V
- Exposure to **syphilis** - Benzathine penicillin G



# ONE LINERS

- **MIC** (Minimum Inhibitory Concentration) is the **lowest possible** concentration of the drug that inhibits visible growth **after 24 hours** of incubation. **Lesser MIC = more Potent**
- **Optimal dose** is the dose of antimicrobial drug that inhibits growth of **90% organisms** at the site of infection
- **Mutation** cause resistance to **one drug** whereas **plasmid** can cause **multidrug resistance**
- **Ambler's** classification of beta lactamase is based on **structure of enzyme** and **Bush's** classification is based on **substrate of enzymes** and it's **inhibitors**
- **Long post antibiotic effect** has been noted with — Fluoroquinolones, aminoglycosides, Beta-lactam antibiotics
- **Bactericidal** drugs are must in **immunocompromised** patients
- **DOC** for **syphilis in pregnancy** — **Penicillin**
- **Longest acting** fluoroquinolone — **Sparfloxacin** (20 hrs)
- Methicillin resistance occurs due to **altered PBP** (Penicillin Binding Proteins)
- **DOC** for **chlamydial infection** — **Doxycycline**
- **Demeclocycline** > **Doxycycline** cause **photosensitivity**
- **Isoniazid** maximum crosses **BBB** & is associated with **neuropsychiatric** symptoms like **memory loss**, **euphoria** & **hallucinations**
- **Multi Drug Resistance** (MDR) TB is resistance to both **Isoniazid** & **Rifampicin**







# ONE LINERS

- **Extremely Drug Resistance** (XDR) TB is a case of MDR with additional resistance to **Fluoroquinolone** and to at least one of the injectable second line drugs like **Amikacin**, **Kanamycin** or **Caperomycin**.
- **Bedaquiline** & **Delamanid** are recent drugs for the treatment of MDR TB
- **DOC** for **chlamydial** infection in **pregnancy** – **Macrolides** ( eg. Erythromycin)
- **Sulfonamides** can cause **Acute intermittent porphyria**
- **Brinzolamide** is contraindicated in patient with **sulfonamide allergy** because of structural similarity
- **Sulfasalazine** is used orally for the treatment of **Ulcerative colitis**
- **Sparfloxacin** and **Astemizole** can cause **Ventricular arrhythmia**
- **Multiple drug resistance** is transferred through – **Conjugation**
- **Most common** mechanism of transfer of **resistance** in **Staphylococcus aureus** is **Transduction**
- **Sutezolid** is currently under trial for treatment of **TB**
- **Chloramphenicol** is responsible for **Bone marrow suppression**
- **Mupirocin** is a **topical** antibiotic of choice for **staphylococcal nasal carriage**



# Anti-tumor Antibiotics

Dactinomycin

Doxorubicin (Adriamycin)

Daunorubicin

Bleomycin

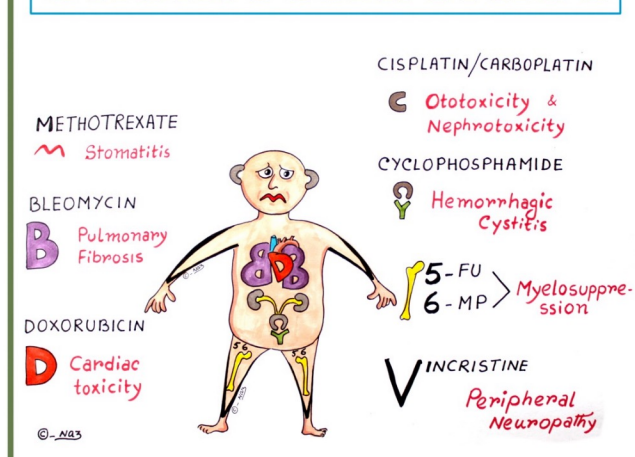
Mitomycin C

Mitoxantrone

“mycin & bicin”

- Substances derived from **microorganisms** that have inhibitory effect on **tumor cells**
- Bind to **DNA** inhibit **Topoisomerase II** and generate **free radicals** due to electron transfer
- They cause **DNA damage** in all phases, but the cell cycle arrest is seen particularly in **G2** and **S phase**
- **Toxicities** mostly caused by **free radicals** that can cause **Cardiomyopathy** and **Pulmonary fibrosis**

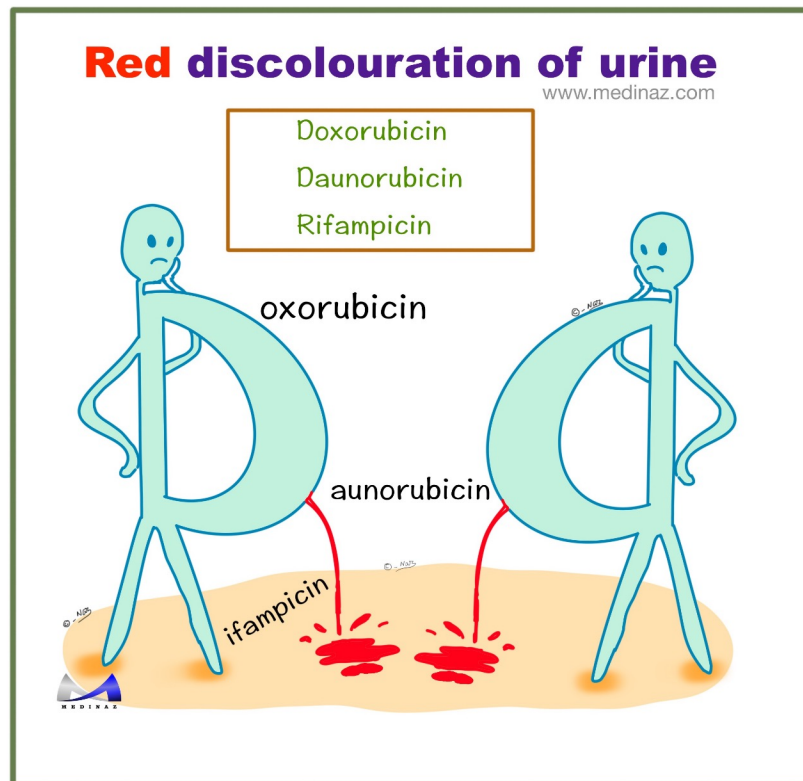
## Chemotoxicities





## Anthracycline Group

- Derived from a fungus *Streptomyces peucetius*
- Free radical production requires Fe atoms for electron transport
- Fe chelating agent Dexrazoxane is the antidote of choice for anthracycline toxicity
- Doxorubicin is used for the treatment of Ovarian cancer, Sarcoma (Osteosarcoma), Lymphoma, Multiple myeloma
- Daunorubicin/ Idarubicin along with cytarabine (Ara-c) is the treatment of choice for Acute Myelogenous Leukemia (AML)
- Doxorubicin & Daunorubicin are the DOC for Kaposi sarcoma
- Epirubicin is used for Breast cancer
- Valrubicin is used for Bladder cancer
- Mitoxantrone is a doxorubicin derivative with less cardiotoxicity (cause secondary leukemia)
- Cardiotoxicity is maximum with Doxorubicin & Daunorubicin
- Acute toxicity presents as Pericarditis-myocarditis syndrome followed by Arrhythmia
- Long term use can cause Congestive heart failure due to Dilated cardiomyopathy
- Vacuolar myofibril degeneration is seen under electron microscopy
- Doxorubicin is a powerful vesicant (Given by rapid flowing IV line)
- Doxorubicin & Daunorubicin cause Red discoloration of urine
- Doxorubicin, Daunorubicin & Actinomycin D Cause Radiation recall syndrome



(**Radiation recall syndrome** : Radiotherapy cause local changes like desquamation, erythema etc, which subsides with time. After this if chemotherapy is started and the same local changes reappear, which is called as Radiation recall)

## Mitomycin-C

- Potent **radiosensitizer** and has an **alkylating agent like** activity
- It is used along with **5-FU** for the treatment of **anal cancer**
- It is used for the prevention of **laryngotracheal, esophageal stenosis & post nasal surgery synechiae** formation
- It can cause **Haemolytic Uremic Syndrome (HUS), TTP & Pulmonary fibrosis**







## Dactinomycin (actinomycin D)

- Intercalates into DNA, prevent RNA synthesis.
- Wilms tumor, Ewing sarcoma, rhabdomyosarcoma. Used for childhood tumors.
- It can cause early myelosuppression, radiation recall syndrome.

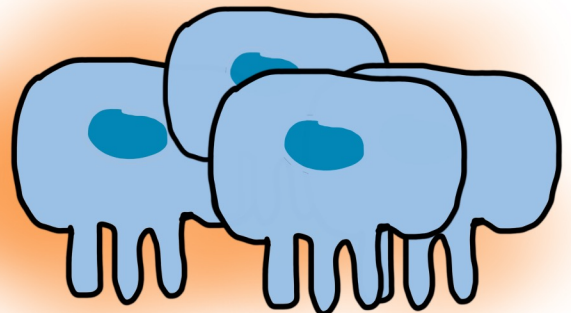
## Bleomycin

- Induces free radical formation which breaks in DNA strands
- Used for the treatment of Testicular cancer in BEP regimen, Hodgkin lymphoma in ABVD regimen.
- It can cause Pulmonary fibrosis, flagellate dermatitis (skin hyperpigmentation). Minimal myelosuppression & Raynaud's phenomenon
- Free radicals damage type I pneumocytes which leads to type II pneumocytes hyperplasia

type I



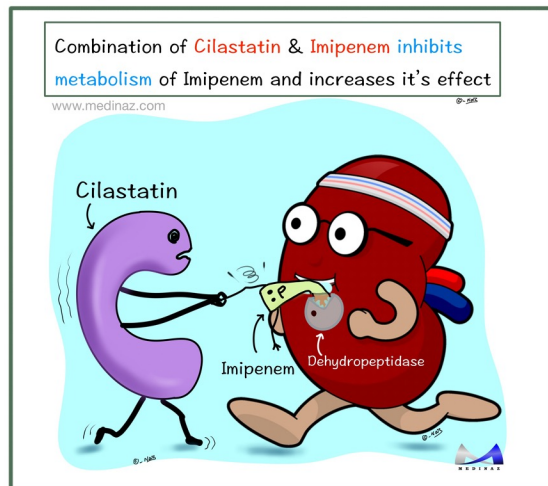
type II





# One Liners

- Cell wall synthesis **inhibitors** like **penicillin** and **vancomycin** increase uptake of **aminoglycosides**.
- Drugs blocking enzymes sequentially like **DHPS** with **sulfamethoxazole** and **DHFR** with **trimethoprim** gives a **synergistic** effect in the form of **bactericidal** effect.
- Combination of **Cilastatin** & **Imipenem** **inhibits** metabolism of **Imipenem** and increases it's effect



- **Bacteriostatic** drugs like Tetracycline and Macrolides can **inhibit** the effect of **Bactericidal** drugs like penicillin
- Antibiotics like **ampicillin**, **cefoxitin** and **imipenem** can **induce beta lactamase production** and increase degradation of other beta lactamase drugs
- **Penicillin** can inactivate **aminoglycosides** in **solutions**
- **DOC** for **gonococcal plus non-gonococcal** mucopurulent cervicitis – **Azithromycin 2 gm oral single dose**



# One Liners

- Biofilm mechanism of resistance to antibiotics includes –

Mechanical barrier (exopolysaccharide matrix)

Growth rate decreased

Persisters: Bacteria undergoes

phenotypic modification into dormant,

spore like structures and survive antibiotic insult

Efflux pump which pump the drug out of the biofilm

Enzymatic inactivation

“My Green PEE”



- Empirical drug of choice for treatment of meningococcal meningitis –

Ceftriaxone

- DOC for prophylaxis and treatment of pneumocystis infection in both immunocompetent as well as immunocompromised is cotrimoxazole

- Treatment of choice for Burkholderia Cepacia – Carbapenams & 3rd generation cephalosporin

- Auditory toxicity is caused by – Kanamycin, Amikacin, Neomycin

Kanamycin

Amikacin

Neomycin

K

A

N





# One Liners

- **H. influenza** has a **plasmid** for activity against **beta lactamase**, hence **Cefotaxime** is preferred over ampicillin
- **Silver sulfadiazine** can be applied **topically** for the treatment of **keratomycosis**
- **ESBL** production is detected by the ability of the microorganism to hydrolyze **3 rd generation** cephalosporin
- **Cefoperazone** is **safe** in **renal failure**
- Cephalosporins like **Ceftriaxone** and **Cephmandole** can cause **drug induced thrombocytopenia**

**DOC for typhoid –**

**Outpatients** – Cefixime 20mg/kg/day for 14 days or Azithromycin 500 mg BD for 7 days

**Inpatients** – Ceftriaxone 2gm IV BD for 2 weeks +/- Azithromycin 500mg BD for 7 days

**- Empirical treatment for meningitis**

**0-3 months** – Ampicillin + Cefotaxime

**3 months – 55 years** – Vancomycin + Cefotaxime / Ceftriaxone / Cefepime

**> 55 years** – Vancomycin + cefotaxime / ceftriaxone / cefepime + Ampicillin

**Most effective** antibiotic for acne – **Minocycline**







# One Liners

- Ceftriaxone is the best drug for the treatment of diplococci like streptococcus and gonococcus
- Antibiotic of choice in Campylobacter gastroenteritis – Erythromycin
- Daptomycin depolarizes the cell membrane and bacteria dies due to potassium efflux
- Daptomycin can cause myopathy
- Jarisch-Herxheimer reaction is seen in syphilis with Penicillin
- DOC for Nocardiosis – Trimethoprim + SMX
- Streptomycin is a glycoside
- Streptomycin can enhance the toxicity of depolarizing skeletal muscle relaxant
- Rifabutin is more effective against Mycobacterium avium complex (MAC) as compared to Rifampicin

Second line antitubercular drugs

Two = Thioacetazone

P = PAS

E = Ethionamide

A = Amikacin

C = Caperomycin, Calithromycin

O = Ofloxacin

C = Ciprofloxacin, Cycloserine

K = Kanamycin

S = Streptomycin

Making = Moxifloxacin

Blind = Bedaquiline

Love = Linezolid

On

Date = Delamanid





# One Liners

- Rifampicin being an enzyme inducer can decrease efficacy of anti-HIV drugs like Nevirapine and Protease inhibitors which are metabolized by microsomal enzymes should be avoided in HIV +ve patients
- Gene responsible for Rifampicin resistance – rpoB

Rifampicin resistance – rpoB

- Fidaxomicin - the new FDA approved drug for Clostridium difficile infection
- Antitubercular drug associated with hypothyroidism – Ethionamide
- Cross resistance of Isoniazid is seen with Ethionamide
- Most common drug used in leprosy - Dapsone